

Increasing Pollinator Plant Diversity in Pasture, Judith Basin County, MT

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Objective: Increase pollinator plant species diversity in smooth brome / alfalfa pasture

County: Judith Basin County

Average Annual Precipitation: 16 inches

MLRA: 46, Northern Rocky Mountain Foothills

Dominant Soil Types: Winifred clay loam

Elevation: 4430 ft

Site Preparation: Heavy cattle grazing followed by herbicide treatment

Seeding Date: May 2020

Seeding Method: Drill seed at the standard rate, seed mixes at 25 seeds/ft²

Acres Seeded: Species seeded individually, mixed, and in alternate rows of grasses and forbs

Previous Site History: Smooth brome / alfalfa pasture with other introduced grass species

Herbicide: Glyphosate (Roundup) at 6% solution was applied April 2020

Irrigation: None

Grazing: Wildlife

Monitoring Dates: Aug 2020, June 2021



Fig 1. Sainfoin established in drill rows, especially in bare areas where vegetation was controlled by herbicide. Notice wildlife grazing on seedlings, August 2020.

Introduction:

The field planting goal was to improve plant species diversity, particularly pollinator plants, in a smooth brome and alfalfa pasture. Prior to seeding, the area was heavily grazed by cattle and sprayed with glyphosate to reduce existing plants and litter. Species seeded have done well in other field plantings, are quick establishers, and/or are species naturally growing with smooth brome (Table 1). Species were seeded individually, in a complete-species mix, and in alternate-rows of grasses and forbs. Grazing smooth brome in the spring and at boot stage may harm its root reserves and stress the plants. This grazing timing should not harm warm season grass species, but it may decrease the competitiveness of smooth brome to allow seeded species to establish. Alternate-row seeding tested if forbs establish better when seeded alone than when seeding a grass-forb mix.

Results Summary:

- Smooth brome and alfalfa were stunted in 2020 from the herbicide treatment but re-established in 2021. Additional site preparation was needed to control these species prior to seeding.
- Seeded species established better where herbicide provided control of existing plants (i.e. bare areas).
- Blanketflower was the best establishing native forbs in 2020. Blanketflower did particularly well in the understory of existing vegetation in 2020 but was not found in 2021. Sainfoin was the best establishing introduced forb in 2020 and was scattered throughout the site in 2021 with low percent canopy cover.
- Tall wheatgrass was the best establishing grass and was scattered throughout the seed area in low amounts in both years. Other grass species establishment was patchy in 2020.
- Follow-up management could include cattle grazing to reduce smooth brome and alfalfa cover to determine if any additional seeded species will establish or expand.

Table 1. Seeded species, their seeding rate and bloom period, and the 2020 and 2021 evaluation results.

Common Name	Scientific Name	Cultivar	Origin/ Season	Bloom Period ¹	lbs PLS/acre	Evaluation Notes
Sideoats grama	<i>Bouteloua curtipendula</i>	Bad River	Native, warm	-	6.0	No establishment 2020 or 2021
Switchgrass	<i>Panicum virgatum</i>	Forestburg	Native, warm	-	3.0	2020: Patchy establishment with no seed production. 2021: none found.
Tall wheatgrass	<i>Thinopyrum ponticum</i>	Alkar	Introduced, cool	-	10.0	2020: Obvious drill rows of seedlings; up to 12 inches tall; seed production on 10% plants; up to 5% canopy cover in areas. 2021: trace amounts.
Thickspike wheatgrass	<i>Elymus lanceolatus</i>	Critana	Native, cool	-	7.0	Trace establishment both years
Blanketflower	<i>Gaillardia aristata</i>	Meriwether	Native	M, L	6.0	2020: Up to 3 plants/ft; seedlings 3 inches tall; established in bare areas and under existing vegetation; widespread throughout the area. 2021: none found.
Prairie coneflower	<i>Ratibida columnifera</i>	Stillwater	Native	E, M, L	2.0	2020: Scattered seedlings throughout the area; 3 inches tall; mostly in bare areas. 2021: none found.
Western yarrow	<i>Achillea millefolium</i>	Great	Native	E, M, L	0.5	No establishment 2020 or 2021
Birdsfoot trefoil	<i>Lotus corniculatus</i>	Leo	Introduced	E, M, L	3.0	2020: Scattered seedlings throughout area; up to 7 inches tall with 10% of plants flowering. 2021: none found.
Red clover	<i>Trifolium pratense</i>	Mammoth	Introduced	E, M, L	4.0	2020: Seedlings rare; average 3 inches tall and larger in understory of existing vegetation. 2021: none found.
Sainfoin	<i>Onobrychis viciifolia</i>	Delaney	Introduced	E, M, L	34.0	2020: Obvious drill rows of seedlings in bare areas; throughout seed area; plants grazed by wildlife. 2021: present at 1% canopy cover throughout area.

¹Bloom periods: Early (April, May, June), Middle (July, August), and Late (September, October)



Fig. 2. Seeding into grazed and sprayed (Roundup) pasture with a plot drill, May 2020.



Fig 3. Blanketflower established well in drill rows, in the understory of re-establishing smooth brome, August 2020.



Fig 4. Smooth brome and alfalfa re-established in 2021 with low coverage of thickspike and tall wheatgrasses and sainfoin.